

AMENDMENTS TO THE CLAIMS

This listing of claims supersedes all prior versions and listings of claims in this application:

LISTING OF CLAIMS:

1. (Currently Amended) A mercury-free arc tube for a discharge lamp unit comprising:
a spheroidal closed glass bulb;
a pinch seal on each end of the closed glass bulb; and
opposing electrodes disposed in the glass bulb, the glass bulb being filled with a primary light-emitting metal halide and a starting rare gas, a pressure of the starting rare gas being 8 to 20 atm, wherein an inner diameter of the glass bulb at a middle part between the opposing electrodes is 1.5 to 2.7 mm, a distance between the opposing electrodes is 1.0 to 4.0 mm, a length of each of the electrodes extending into the glass bulb is 0.3 to 1.8 mm, and a stable discharge is produced with a power of 15 to 30 W₁

wherein a ratio of an inner diameter D2 of the glass bulb at tips of the opposing electrodes to an inner diameter D1 of the glass bulb at the middle part between the opposing electrodes (D2/D1) is 0.5 to 1.0.

2. (Original) A mercury-free arc tube according to claim 1, further comprising a buffer metal halide, wherein the primary light-emitting metal halide is at least one member selected from an Na halide, an Sc halide, and a Dy halide, the buffer metal halide is at least one member selected from an Al halide, a Cs halide, an Ho halide, an In halide, a Tl halide, a Tm halide, and a Zn halide, the total amount of the metal halides in the glass bulb is 10 to 30 mg/ml, and the ratio of the buffer metal halide to the total amount of the metal halides is 0 to 50% by weight.

3. (Cancelled).

4. (Original) A mercury-free arc tube according to claim 1, wherein a ratio of a tube current I (unit: A) supplied to the arc tube to the outer diameter d (unit: mm) of the electrodes sticking out inside the glass bulb (I/d) is 1.0 to 4.0 (A/mm).

5. (Original) A mercury-free arc tube according to claim 1, further comprising a cylindrical glass shroud integrally welded to said arc tube to provide a closed space enclosing the glass bulb, the closed space being filled with an inert gas at a pressure of 1 atm or lower.

6-20. (Cancelled).